



Fundamental of R

Outline

- Installation R CRAN & R Studio
- Introduction R console
- Organising the work before start a new project
- Use R as a calculator
- Naming variable and attributes

1.0 Installation

- Download and Install R from <https://cran.r-project.org/>



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R-3.3.0 for Windows (32/64 bit)

[Download R 3.3.0 for Windows](#) (62 megabytes, 32/64 bit)
[Installation and other instructions](#)
[New features in this version](#)

If you want to double-check that the package you have downloaded exactly matches the package distributed by R, you can compare the [md5sum](#) of the .exe to the [true fingerprint](#). You will need a version of md5sum for windows: both [graphical](#) and [command line versions](#) are available.

Frequently asked questions

- [Does R run under my version of Windows?](#)
- [How do I update packages in my previous version of R?](#)
- [Should I run 32-bit or 64-bit R?](#)

Please see the [R FAQ](#) for general information about R and the [R Windows FAQ](#) for Windows-specific information.

Other builds

- Patches to this release are incorporated in the [r-patched snapshot build](#).
- A build of the development version (which will eventually become the next major release of R) is available in the [r-devel snapshot build](#).
- [Previous releases](#)

Note to webmasters: A stable link which will redirect to the current Windows binary release is [<CRAN MIRROR>/bin/windows/base/release.htm](https://CRAN.MIRROR/bin/windows/base/release.htm).

Last change: 2016-05-04, by Duncan Murdoch

2.0 Introduction R console

2.1 Starting and quitting R

1. Double click R icon
2. It prompts *console*

3.0 Organising the work before start a new project

- Key goal: efficient and organised

Step 1: Create a new folder

Step 2: C&P the R launcher

Step 3: Edit the **Properties** of the launcher and
C&P the folder **path** in the field “start in”

3.1 Integrating with R: the command line

- “>|” means R is waiting for user to enter an instruction to execute.
- Once key in the instruction, press “Enter” and R will execute the instruction.
- The output of this instruction will printed to screen.
- “+” means that the previous instruction was incomplete and R is waiting for user to complete it.
- “#” means comment, R will ignore the following instruction, it is a notes for other users.

4.0 Use R as a calculator (1)

- The greater-than sign ($>$) is a prompt symbol.
 $>$ appears: can begin typing commands.

```
 $> 13+5$ 
```

- Upon pressing the Enter key, the result 18 appears, prefixed by the number 1 in square brackets:

```
 $> 13+5$   
[1] 18
```

4.0 Use R as a calculator (2)

- [1] : first result from the command
- Other commands return multiple values and each line of results will be labeled to aid the user in deciphering the output.

```
> 1:20
```

```
[1] 1 2 3 4 5 6 7 8 9 10 11 12
```

```
[13] 13 14 15 16 17 18 19 20
```


4.0 Use R as a calculator (3)

- Arithmetic Operations:
 - $+$, $-$, $*$, $^$ are the standard arithmetic operators.

```
> 19*4
```

```
[1] 76
```

```
> 3-7
```

```
[1] -4
```

```
> 18/9
```

```
[1] 2
```

```
> 3^4
```

```
[1] 81
```

```
> 18%%5
```

```
[1] 3
```

Creating objects/ named storage

- Store results of calculations
 - compound interest calculation based on an interest rate of 0.15% per year and a 20-year period.

```
> interest_20 <- 1.0015^20  
>
```

-To see the content of the object, type its name at the command line then “Enter”

```
> interest_20  
[1] 1.030431
```

Creating objects/ named storage(2)

- Further calculation
 - use the variable as a shortcut to its value for any sort of instruction

```
>initial_balance<-4000  
>final_balance<-initial_balance * interest_20  
>final_balance  
[1]4121.725
```

Creating objects/ named storage(3)

- Naming convention

- cannot start with a numeric value or symbol
- do not contains space
- no special character eg. !, @, \$,/, &and etc.
- case sensitive

Object Name	T	F
7years_interest		
_package5		
todayneedtopaymoney		
apple&doctor		
my.variable1		

Remove objects/ named storage

- Delete object

```
> final_balance
```

```
[1] 4121.725
```

```
> rm(final_balance)
```

```
> final_balance
```

```
Error in eval (expr, envir, enclos): object 'final_balance' introuvable
```

Exercise

Aaron wishes to take out a loan, today, of P , **RM 1500** at a monthly interest rate i , 1% . The loan is to be paid back in n , 12 monthly installments, R amount each month. Calculate R , the monthly payment for this particular loan.

Equating the present value, P to the future (discounted) value of the n monthly payments R , we have:

$$P = R(1 + i)^{-1} + R(1 + i)^{-2} + \dots + R(1 + i)^{-n}$$

or

$$P = R\left(\frac{1 - (1 + i)^{-n}}{i}\right)$$

Solution

$$\text{Monthly payment, } R = P \left(\frac{1 - (1+i)^{-n}}{i} \right)$$

```
>intRate<-0.01  
>n<-12  
>principal<-1500  
>monthly_payment<-principal*intRate/(1-(1+intRate)^(-n))  
>monthly_payment  
[1] 133.2732
```

References



